



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/007,054	12/03/2001	Noriyuki Yokouchi	FUSO3.001AUS	6225
20995	7590	11/14/2003	EXAMINER	
KNOBBE MARTENS OLSON & BEAR LLP 2040 MAIN STREET FOURTEENTH FLOOR IRVINE, CA 92614			LUND, JEFFRIE ROBERT	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 11/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/007,054	YOKOUCHI ET AL.	
	Examiner	Art Unit	
	Jeffrie R. Lund	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 28-31 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 28-31 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1-12, and 27-31 in Paper No. 9, filed March 31, 2003, is acknowledged.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-7 and 28-31 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The newly added limitations of a "VCSEL oxidation system" and a "VCSEL" supported on the stage is not found in or suggested by the specification or the claims as originally filled.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "said semiconductor material" in lines 8 and 9.

There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 5, and 7 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Bowman et al, US patent 5,044,943.

Bowman et al teaches the claimed invention in figure 2 and throughout the specification, specifically, column 3 lines 12-15.

8. Claims 1, 2, 4, 6, and 7 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Mizuno et al, US patent 5,534,072.

Mizuno et al teaches the claimed invention in figure 1 and 2, and throughout the specification, specifically, column 14 lines 5-20.

9. Claims 1-3 and 5-7 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Moore, US patent 5,820,686.

Moore teaches the claimed invention in figure 2, 4A-4J, 22A-F, and throughout the specification, specifically, column 9 line 33 through column 13 line 47 and column 23 lines 25-44.

10. Claims 1, 2, and 5-7 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Wang et al, US patent 6,167,834 B1.

Wang et al teaches the claimed invention throughout the abstract and specification, specifically, column 9 lines 37-48.

11. Claims 1, 4, 6, and 7 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Ohmi et al, US patent 6,423,178 B1.

Ohmi et al teaches the claimed invention in figures 1 and 3, and throughout the specification, specifically, column 3 lines 46-48.

12. Claims 1, 7, 28, and 30 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Ho et al, US patent 6,500,266 B1.

Ho et al teaches the claimed invention in figures 3 and 9, and throughout the abstract and specification, specifically, column 4 lines 8-12, column 6 lines 21-24, and column 8 lines 9-16.

13. Claims 1, and 4-7 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Kholodenko et al, US patent 6,503,368 B1.

Kholodenko et al teaches the claimed invention in figures 1a and 3, and throughout the specification, specifically, column 3 lines 7-34, and claim 12.

14. The examiner notes that:

- a. Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danley*, 120 USPQ 528, 531, (CCPQ 1959); "Apparatus claims cover what a device is, not what a device does" (Emphasis in original) *Hewlett-Packard Co. V. Bausch & Lomb Inc.*, 15 USPQ2d

1525, 1528 (Fed. Cir. 1990); and a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus " if the prior art apparatus teaches all the structural limitations of the claim *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Also see MPEP 2114.

b. "Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim." *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969). Furthermore, "Inclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims." *In re Young*, 25 USPQ 69 (CCPA 1935) (as restated in *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

c. All of the above patents are inherently capable of performing an oxidization process on any substrate (including a VCSEL) containing an aluminum containing layer to create an aluminum oxidized area and an aluminum non-oxidized area.

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claims 1, 4-7, and 28-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masakazu Arai et al, in AIAs Oxidation System with H₂O Vaporizer for Oxide-Confined Surface Emitting Lasers in view of Kholodenko et al.

Masakazu Arai et al teaches an AIAs Oxidation System with H₂O Vaporizer for Oxide-Confined Surface Emitting Lasers that includes a rotating pedestal in figure 1.

Masakazu Arai et al does not teach a wafer holder with an embedded heater that is made of silicon or silicon carbide.

Kholodenko et al teaches a holder that includes a first section 88 and second section 90. The first section 88 is mounted on the second section 90 and includes: a wafer support surface made of silicon, silicon carbide, or copper, and an embedded resistive heater. Kholodenko et al also teaches that the support can be mounted on a shaft.

The motivation for replacing the generic holder of Masakazu Arai et al with the holder of Kholodenko et al is to supply the required but generically described holder. Furthermore, Kholodenko et al teaches a holder that may be used at elevated temperatures without excessive thermal expansion stresses, and to maintain uniform heat transfer rates and temperature differentials across a substrate during its processing.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the holder of Kholodenko et al in the apparatus of Masakazu Arai et al.

17. Claims 1-3, and 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masakazu Arai et al, in AIAs Oxidation System with H₂O Vaporizer for Oxide-Confined Surface Emitting Lasers in view of Moore.

Masakazu Arai et al teaches an AIAs Oxidation System with H₂O Vaporizer for Oxide-Confined Surface Emitting Lasers that includes a rotating pedestal in figure 1.

Masakazu Arai et al does not teach a wafer holder that is made of graphite or silicon carbide with a thickness of approximately 1 mm.

Moore teaches a holder that includes a wafer support surface made of graphite or silicon carbide with a thickness of approximately 1 mm.

The motivation for replacing the generic holder of Masakazu Arai et al with the holder of Moore is to supply the required but generically described holder. Furthermore, Moore teaches a holder that maintains uniform temperature and facilitates maintaining uniform process gas characteristics over the substrates.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the holder of Moore in the apparatus of Masakazu Arai et al.

18. Claims 1, 2, 4, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masakazu Arai et al, in AIAs Oxidation System with H₂O Vaporizer for Oxide-Confined Surface Emitting Lasers in view of Mizuno et al.

Masakazu Arai et al teaches an AIAs Oxidation System with H₂O Vaporizer for Oxide-Confined Surface Emitting Lasers that includes a rotating pedestal in figure 1.

Masakazu Arai et al does not teach a wafer holder that is made of copper.

Mizuno et al teaches a holder that includes a wafer support surface made of copper.

The motivation for replacing the generic holder of Masakazu Arai et al with the holder of Mizuno et al is to supply the required but generically described holder. Mizuno et al further teaches that using a material with a high thermal conductivity, such as copper, will maintain a uniform temperature across the substrate and enable precise control of the temperature of the substrate (column 15 lines 5-21).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the holder of Mizuno et al in the apparatus of Masakazu Arai et al.

Response to Arguments

19. Applicant's arguments filed October 20, 2003 have been fully considered but they are not persuasive.

In regard to the argument that none of the references cited in the 102 rejections teaches the oxidation of a VCSEL, the examiner agrees. However, the term "VCSEL" as noted above is new mater. VCSEL or its definition i.e. vertical cavity surface emitting lasers was not found in or suggested in the specification or claims as originally filed. At best, the specification discloses a surface emitting semiconductor laser device in which an aluminum layer is oxidized.

In regard to the argument that by reciting a specific workpiece i.e. a VSCEL makes the workpiece a structural element of the apparatus, the examiner disagrees. A work piece is never a structural element of the apparatus that works upon the

workpiece. As noted in Paragraph 11a of the previous office action, (or 14a above) an apparatus is what it is, not what it does. Changing the generic wafer to a VCSEL only changes the object worked upon and not the structure of the apparatus. The applicant is referred to paragraph 11b of the previous action (or paragraph 14b above), which states:

"Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim." Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969). Furthermore, "Inclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims." In re Young, 25 USPQ 69 (CCPA 1935) (as restated in In re Otto, 136 USPQ 458, 459 (CCPA 1963).

Therefore, making the generic semiconductor wafer a VCSEL wafer does not limit the structure of the claimed invention. Furthermore, all the art used in the 102 rejections above can inherently process any type of wafer as noted in paragraph 11c of the previous action (or paragraph 14c above).

In regard to the arguments of unexpected results, the examiner disagrees. First, the limit of 100 W/K/m is an arbitrary point on the graph presented. In this data, silicon, which has a thermal conductivity of 145 W/K/m has a uniformity of $\pm 1.00 \mu\text{m}$ while graphite, which has a thermal conductivity of 140 W/K/m has a uniformity of $\pm 0.50 \mu\text{m}$ thus a decrease of 5 W/K/m in thermal conductivity resulted in an improved uniformity. This trend of a decrease in thermal conductivity resulting in an improvement in the uniformity can also be seen in the PBN susceptor (65 W/K/m) and the sapphire

susceptor (45 W/K/m). Furthermore, if a decrease of uniformity from $\pm 0.5 \mu\text{m}$ from graphite to silicon is acceptable, why is the same decrease in uniformity from silicon to sapphire not acceptable? At best the data suggests that the higher the thermal conductivity the more uniform the oxidization will be, but this is not constant as noted above. The examiner acknowledges the reasoning supplied by the applicant in the specification for the low uniformity of silicon, and notes that uniformity can also be dependant on the material of the holder due to its interaction with the oxidizing gases. Second, it is well known in the art that the higher the thermal conductivity of the holder the more uniform the temperature of the wafer and the more uniform the oxide or other layer grown or deposited. All of the cited prior art is directed to this end. For specific examples of this, please see Kholodenko et al, Moore, and Mizuno et al as discussed above.

Conclusion

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

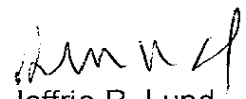
Art Unit: 1763

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrie R. Lund whose telephone number is (703) 308-1796 (or 571-272-1437 after 12/10/03). The examiner can normally be reached on Monday-Thursday (6:30 am-6:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.


Jeffrie R. Lund
Primary Examiner
Art Unit 1763

JRL
November 10, 2003